

CLAIMS

What is claimed is:

- 5 1. An apparatus for stimulating a vagus nerve of a patient, comprising:
- a first electrode positioned within the esophagus of said patient;
- a second electrode positioned within the esophagus of
10 said patient in spaced apart relation to said first electrode; and
- means operatively associated with said first and second electrodes for actuating at least one of said electrodes to create an electrical field effective to stimulate said
15 vagus nerve.
2. The apparatus of Claim 1 wherein said second electrode is disposed within the esophagus of said patient approximately one centimeter from said first electrode.
- 20 3. The apparatus of Claim 1, wherein said means for actuating at least one of said electrodes to create an electrical field comprises a means for actuating both of said first and second electrodes to create an electrical field.
- 25 4. The apparatus of Claim 1, wherein said means for actuating at least one of said electrodes to create an electrical field comprises a means for actuating one or both of said electrodes in one of a unipolar or a bipolar mode.
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5. The apparatus of Claim 1, wherein said means for actuating at least one of said electrodes to create an electrical field is operative to actuate said at least one of said electrodes to stimulate said vagus nerve for a period of between about five and about ninety seconds.

6. The apparatus of Claim 5, wherein said actuating means is operative to actuate said at least one of said electrodes to stimulate said vagus nerve for a period of between about five and about fifteen seconds.

7. The apparatus of Claim 1, wherein said means for actuating at least one of said electrodes to create an electrical field comprises a means for transmitting an impulse to said at least one of said electrodes at a frequency of between about one Hertz and about five hundred Hertz.

8. The apparatus of Claim 7, wherein said means for transmitting an impulse to said at least one of said electrodes at a frequency of between about one Hertz and about five hundred Hertz comprises a means for transmitting an impulse to said at least one of said electrodes at a frequency of between about twenty Hertz and about eighty Hertz.

9. The apparatus of Claim 8, wherein said means for transmitting an impulse to said at least one of said electrodes at a frequency of between about twenty Hertz and about eighty Hertz comprises a means for transmitting an impulse to said at least one of said electrodes at a frequency of about forty Hertz.

10. The apparatus of Claim 1, wherein said means for actuating said electrode to create an electrical field comprises a means for transmitting electrical impulses having a duration of 0.4 msec for actuating said electrode.

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11. The apparatus of Claim 1, wherein said means for actuating said electrode to create an electrical field comprises a means for transmitting to said electrode an electrical impulse having an amplitude of from about one to about forty volts.

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12. The apparatus of Claim 11, wherein said means for transmitting to said electrode an electrical impulse having an amplitude of from about one to about forty volts comprises a means for transmitting to said electrode an electrical impulse having an amplitude of from about two to about six volts.

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13. An apparatus for stimulating a vagus nerve of a patient, comprising:

a first electrode positioned within the trachea of said patient;

a second electrode positioned within the trachea of said patient in spaced apart relation to said first electrode; and

means operatively associated with said first and second electrodes for actuating at least one of said electrodes to create an electrical field effective to stimulate said vagus nerve.

14. The apparatus of Claim 13 wherein said second electrode is disposed within the trachea of said patient approximately one centimeter from said first electrode.

15. The apparatus of Claim 13, wherein said means for actuating at least one of said electrodes to create an electrical field comprises a means for actuating both of said first and second electrodes to create an electrical field.

16. The apparatus of Claim 13, wherein said means for actuating at least one of said electrodes to create an electrical field comprises a means for actuating one or both of said electrodes in one of a unipolar or a bipolar mode.

17. The apparatus of Claim 13, wherein said means
for actuating at least one of said electrodes to create an electrical
field is operative to actuate said at least one of said electrodes to
stimulate said vagus nerve for a period of between about five
5 and about ninety seconds.

18. The apparatus of Claim 17, wherein said actuating
means is operative to actuate said at least one of said electrodes
to stimulate said vagus nerve for a period of between about five
10 and about fifteen seconds.

19. The apparatus of Claim 13, wherein said means
for actuating at least one of said electrodes to create an electrical
field comprises a means for transmitting an impulse to said at
least one of said electrodes at a frequency of between about one
15 Hertz and about five hundred Hertz.

20. The apparatus of Claim 19, wherein said means
for transmitting an impulse to said at least one of said electrodes
at a frequency of between about one Hertz and about five
hundred Hertz comprises a means for transmitting an impulse to
said at least one of said electrodes at a frequency of between
about twenty Hertz and about eighty Hertz.

21. The apparatus of Claim 20, wherein said means
for transmitting an impulse to said at least one of said electrodes
at a frequency of between about twenty Hertz and about eighty
Hertz comprises a means for transmitting an impulse to said at
least one of said electrodes at a frequency of about forty Hertz.

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22. The apparatus of Claim 13, wherein said means for actuating said electrode to create an electrical field comprises a means for transmitting electrical impulses having a duration of 0.4 msec for actuating said electrode.

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23. The apparatus of Claim 13, wherein said means for actuating said electrode to create an electrical field comprises a means for transmitting to said electrode an electrical impulse having an amplitude of from about one to about forty volts.

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24. The apparatus of Claim 13, wherein said means for transmitting to said electrode an electrical impulse having an amplitude of from about one to about forty volts comprises a means for transmitting to said electrode an electrical impulse having an amplitude of from about two to about six volts.

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25. An apparatus for stimulating a vagus nerve of a patient, comprising:

a first electrode positioned within a jugular vein of said patient;

5 a second electrode positioned within said jugular vein of said patient in spaced apart relation to said first electrode; and

means operatively associated with said first and second electrodes for actuating at least one of said electrodes to create an electrical field effective to stimulate said vagus nerve.

26. The apparatus of Claim 25 wherein said second electrode is disposed within said jugular vein of said patient approximately one centimeter from said first electrode.

27. The apparatus of Claim 25, wherein said means for actuating at least one of said electrodes to create an electrical field comprises a means for actuating both of said first and second electrodes to create an electrical field.

28. The apparatus of Claim 25, wherein said means for actuating at least one of said electrodes to create an electrical field comprises a means for actuating one or both of said electrodes in one of a unipolar or a bipolar mode.

29. The apparatus of Claim 25, wherein said means
for actuating at least one of said electrodes to create an electrical
field is operative to actuate said at least one of said electrodes to
stimulate said vagus nerve for a period of between about five
and about ninety seconds.

30. The apparatus of Claim 29, wherein said actuating
means is operative to actuate said at least one of said electrodes
to stimulate said vagus nerve for a period of between about five
and about fifteen seconds.

31. The apparatus of Claim 25, wherein said means
for actuating at least one of said electrodes to create an electrical
field comprises a means for transmitting an impulse to said at
least one of said electrodes at a frequency of between about one
Hertz and about five hundred Hertz.

32. The apparatus of Claim 31, wherein said means
for transmitting an impulse to said at least one of said electrodes
at a frequency of between about one Hertz and about five
hundred Hertz comprises a means for transmitting an impulse to
said at least one of said electrodes at a frequency of between
about twenty Hertz and about eighty Hertz.

33. The apparatus of Claim 32, wherein said means
for transmitting an impulse to said at least one of said electrodes
at a frequency of between about twenty Hertz and about eighty
Hertz comprises a means for transmitting an impulse to said at
least one of said electrodes at a frequency of about forty Hertz.

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34. The apparatus of Claim 25, wherein said means for actuating said electrode to create an electrical field comprises a means for transmitting electrical impulses having a duration of 0.4 msec for actuating said electrode.

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35. The apparatus of Claim 25, wherein said means for actuating said electrode to create an electrical field comprises a means for transmitting to said electrode an electrical impulse having an amplitude of from about one to about forty volts.

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36. The apparatus of Claim 35, wherein said means for transmitting to said electrode an electrical impulse having an amplitude of from about one to about forty volts comprises a means for transmitting to said electrode an electrical impulse having an amplitude of from about two to about six volts.

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37. An apparatus for stimulating a vagus nerve of a patient, comprising:

a first electrode positioned on the neck of said patient;
a second electrode positioned on the neck of said patient
in spaced apart relation to said first electrode; and
means operatively associated with said first and second
electrodes for actuating at least one of said electrodes
to create an electrical field effective to stimulate said
vagus nerve.

38. The apparatus of Claim 37 wherein said second electrode is disposed on the neck of said patient approximately one centimeter from said first electrode.

39. The apparatus of Claim 37, wherein said means for actuating at least one of said electrodes to create an electrical field comprises a means for actuating both of said first and second electrodes to create an electrical field.

40. The apparatus of Claim 37, wherein said means for actuating at least one of said electrodes to create an electrical field comprises a means for actuating one or both of said electrodes in one of a unipolar or a bipolar mode.

41. The apparatus of Claim 37, wherein said means for actuating at least one of said electrodes to create an electrical field is operative to actuate said at least one of said electrodes to stimulate said vagus nerve for a period of between about five and about ninety seconds.

42. The apparatus of Claim 41, wherein said actuating means is operative to actuate said at least one of said electrodes to stimulate said vagus nerve for a period of between about five and about fifteen seconds.

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43. The apparatus of Claim 37, wherein said means for actuating at least one of said electrodes to create an electrical field comprises a means for transmitting an impulse to said at least one of said electrodes at a frequency of between about one Hertz and about five hundred Hertz.

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44. The apparatus of Claim 43, wherein said means for transmitting an impulse to said at least one of said electrodes at a frequency of between about one Hertz and about five hundred Hertz comprises a means for transmitting an impulse to said at least one of said electrodes at a frequency of between about twenty Hertz and about eighty Hertz.

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45. The apparatus of Claim 44, wherein said means for transmitting an impulse to said at least one of said electrodes at a frequency of between about twenty Hertz and about eighty Hertz comprises a means for transmitting an impulse to said at least one of said electrodes at a frequency of about forty Hertz.

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46. The apparatus of Claim 37, wherein said means for actuating said electrode to create an electrical field comprises a means for transmitting electrical impulses having a duration of 0.4 msec for actuating said electrode.

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47. The apparatus of Claim 37, wherein said means for actuating said electrode to create an electrical field comprises a means for transmitting to said electrode an electrical impulse having an amplitude of from about one to about forty volts.

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48. The apparatus of Claim 47, wherein said means for transmitting to said electrode an electrical impulse having an amplitude of from about one to about forty volts comprises a means for transmitting to said electrode an electrical impulse having an amplitude of from about two to about six volts.

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49. An apparatus for stimulating a vagus nerve of a patient, comprising:

a first electrode positioned within the esophagus of said patient;

5 a second electrode positioned within the trachea of said patient; and

means operatively associated with said first and second electrodes for actuating at least one of said electrodes to create an electrical field effective to stimulate said vagus nerve.

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50. The apparatus of Claim 49 wherein said second electrode is disposed within the trachea of said patient approximately one centimeter from said first electrode in said esophagus of said patient.

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51. The apparatus of Claim 1, wherein said means for actuating at least one of said electrodes to create an electrical field comprises a means for actuating both of said first and second electrodes to create an electrical field.

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52. The apparatus of Claim 1, wherein said means for actuating at least one of said electrodes to create an electrical field comprises a means for actuating one or both of said electrodes in one of a unipolar or a bipolar mode.

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53. The apparatus of Claim 1, wherein said means for actuating at least one of said electrodes to create an electrical field is operative to actuate said at least one of said electrodes to stimulate said vagus nerve for a period of between about five and about ninety seconds.

54. The apparatus of Claim 53, wherein said actuating means is operative to actuate said at least one of said electrodes to stimulate said vagus nerve for a period of between about five and about fifteen seconds.

55. The apparatus of Claim 1, wherein said means for actuating at least one of said electrodes to create an electrical field comprises a means for transmitting an impulse to said at least one of said electrodes at a frequency of between about one Hertz and about five hundred Hertz.

56. The apparatus of Claim 55, wherein said means for transmitting an impulse to said at least one of said electrodes at a frequency of between about one Hertz and about five hundred Hertz comprises a means for transmitting an impulse to said at least one of said electrodes at a frequency of between about twenty Hertz and about eighty Hertz.

57. The apparatus of Claim 56, wherein said means for transmitting an impulse to said at least one of said electrodes at a frequency of between about twenty Hertz and about eighty Hertz comprises a means for transmitting an impulse to said at least one of said electrodes at a frequency of about forty Hertz.

58. The apparatus of Claim 49, wherein said means for actuating said electrode to create an electrical field comprises a means for transmitting electrical impulses having a duration of 0.4 msec for actuating said electrode.

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59. The apparatus of Claim 49, wherein said means for actuating said electrode to create an electrical field comprises a means for transmitting to said electrode an electrical impulse having an amplitude of from about one to about forty volts.

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60. The apparatus of Claim 59, wherein said means for transmitting to said electrode an electrical impulse having an amplitude of from about one to about forty volts comprises a means for transmitting to said electrode an electrical impulse having an amplitude of from about two to about six volts.

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61. An apparatus for stimulating a vagus nerve of a patient, comprising:

a first electrode positioned within the esophagus of said patient;

5 a second electrode positioned within a jugular vein of said patient; and

means operatively associated with said first and second electrodes for actuating at least one of said electrodes to create an electrical field effective to stimulate said vagus nerve.

62. The apparatus of Claim 61 wherein said second electrode is disposed within said jugular vein of said patient approximately one centimeter from said first electrode in said esophagus of said patient.

63. The apparatus of Claim 61, wherein said means for actuating at least one of said electrodes to create an electrical field comprises a means for actuating both of said first and second electrodes to create an electrical field.

64. The apparatus of Claim 61, wherein said means for actuating at least one of said electrodes to create an electrical field comprises a means for actuating one or both of said electrodes in one of a unipolar or a bipolar mode.

65. The apparatus of Claim 61, wherein said means for actuating at least one of said electrodes to create an electrical field is operative to actuate said at least one of said electrodes to stimulate said vagus nerve for a period of between about five and about ninety seconds.

66. The apparatus of Claim 65, wherein said actuating means is operative to actuate said at least one of said electrodes to stimulate said vagus nerve for a period of between about five and about fifteen seconds.

67. The apparatus of Claim 61, wherein said means for actuating at least one of said electrodes to create an electrical field comprises a means for transmitting an impulse to said at least one of said electrodes at a frequency of between about one Hertz and about five hundred Hertz.

68. The apparatus of Claim 67, wherein said means for transmitting an impulse to said at least one of said electrodes at a frequency of between about one Hertz and about five hundred Hertz comprises a means for transmitting an impulse to said at least one of said electrodes at a frequency of between about twenty Hertz and about eighty Hertz.

69. The apparatus of Claim 68, wherein said means for transmitting an impulse to said at least one of said electrodes at a frequency of between about twenty Hertz and about eighty Hertz comprises a means for transmitting an impulse to said at least one of said electrodes at a frequency of about forty Hertz.

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70. The apparatus of Claim 61, wherein said means for actuating said electrode to create an electrical field comprises a means for transmitting electrical impulses having a duration of 0.4 msec for actuating said electrode.

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71. The apparatus of Claim 61, wherein said means for actuating said electrode to create an electrical field comprises a means for transmitting to said electrode an electrical impulse having an amplitude of from about one to about forty volts.

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72. The apparatus of Claim 71, wherein said means for transmitting to said electrode an electrical impulse having an amplitude of from about one to about forty volts comprises a means for transmitting to said electrode an electrical impulse having an amplitude of from about two to about six volts.

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73. An apparatus for stimulating a vagus nerve of a patient, comprising:

a first electrode positioned within the esophagus of said patient;

a second electrode positioned on the neck of said patient; and

means operatively associated with said first and second electrodes for actuating at least one of said electrodes to create an electrical field effective to stimulate said vagus nerve.

74. The apparatus of Claim 73 wherein said second electrode is disposed on the neck of said patient approximately one centimeter from said first electrode in said esophagus of said patient.

75. The apparatus of Claim 73, wherein said means for actuating at least one of said electrodes to create an electrical field comprises a means for actuating both of said first and second electrodes to create an electrical field.

76. The apparatus of Claim 73, wherein said means for actuating at least one of said electrodes to create an electrical field comprises a means for actuating one or both of said electrodes in one of a unipolar or a bipolar mode.

77. The apparatus of Claim 77, wherein said means for actuating at least one of said electrodes to create an electrical field is operative to actuate said at least one of said electrodes to stimulate said vagus nerve for a period of between about five and about ninety seconds.

78. The apparatus of Claim 77, wherein said actuating means is operative to actuate said at least one of said electrodes to stimulate said vagus nerve for a period of between about five and about fifteen seconds.

79. The apparatus of Claim 73, wherein said means for actuating at least one of said electrodes to create an electrical field comprises a means for transmitting an impulse to said at least one of said electrodes at a frequency of between about one Hertz and about five hundred Hertz.

80. The apparatus of Claim 79, wherein said means for transmitting an impulse to said at least one of said electrodes at a frequency of between about one Hertz and about five hundred Hertz comprises a means for transmitting an impulse to said at least one of said electrodes at a frequency of between about twenty Hertz and about eighty Hertz.

81. The apparatus of Claim 80, wherein said means for transmitting an impulse to said at least one of said electrodes at a frequency of between about twenty Hertz and about eighty Hertz comprises a means for transmitting an impulse to said at least one of said electrodes at a frequency of about forty Hertz.

82. The apparatus of Claim 73, wherein said means for actuating said electrode to create an electrical field comprises a means for transmitting electrical impulses having a duration of 0.4 msec for actuating said electrode.

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83. The apparatus of Claim 73, wherein said means for actuating said electrode to create an electrical field comprises a means for transmitting to said electrode an electrical impulse having an amplitude of from about one to about forty volts.

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84. The apparatus of Claim 83, wherein said means for transmitting to said electrode an electrical impulse having an amplitude of from about one to about forty volts comprises a means for transmitting to said electrode an electrical impulse having an amplitude of from about two to about six volts.

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85. An apparatus for stimulating a vagus nerve of a patient, comprising:

a first electrode positioned within the trachea of said patient;

5 a second electrode positioned within a jugular vein of said patient; and

means operatively associated with said first and second electrodes for actuating at least one of said electrodes to create an electrical field effective to stimulate said vagus nerve.

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86. The apparatus of Claim 85 wherein said second electrode is disposed within said jugular vein of said patient approximately one centimeter from said first electrode in said trachea of said patient.

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87. The apparatus of Claim 85, wherein said means for actuating at least one of said electrodes to create an electrical field comprises a means for actuating both of said first and second electrodes to create an electrical field.

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88. The apparatus of Claim 85, wherein said means for actuating at least one of said electrodes to create an electrical field comprises a means for actuating one or both of said electrodes in one of a unipolar or a bipolar mode.

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89. The apparatus of Claim 85, wherein said means for actuating at least one of said electrodes to create an electrical field is operative to actuate said at least one of said electrodes to stimulate said vagus nerve for a period of between about five and about ninety seconds.

90. The apparatus of Claim 89, wherein said actuating means is operative to actuate said at least one of said electrodes to stimulate said vagus nerve for a period of between about five and about fifteen seconds.

91. The apparatus of Claim 85, wherein said means for actuating at least one of said electrodes to create an electrical field comprises a means for transmitting an impulse to said at least one of said electrodes at a frequency of between about one Hertz and about five hundred Hertz.

92. The apparatus of Claim 91, wherein said means for transmitting an impulse to said at least one of said electrodes at a frequency of between about one Hertz and about five hundred Hertz comprises a means for transmitting an impulse to said at least one of said electrodes at a frequency of between about twenty Hertz and about eighty Hertz.

93. The apparatus of Claim 92, wherein said means for transmitting an impulse to said at least one of said electrodes at a frequency of between about twenty Hertz and about eighty Hertz comprises a means for transmitting an impulse to said at least one of said electrodes at a frequency of about forty Hertz.

94. The apparatus of Claim 85, wherein said means for actuating said electrode to create an electrical field comprises a means for transmitting electrical impulses having a duration of 0.4 msec for actuating said electrode.

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95. The apparatus of Claim 85, wherein said means for actuating said electrode to create an electrical field comprises a means for transmitting to said electrode an electrical impulse having an amplitude of from about one to about forty volts.

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96. The apparatus of Claim 95, wherein said means for transmitting to said electrode an electrical impulse having an amplitude of from about one to about forty volts comprises a means for transmitting to said electrode an electrical impulse having an amplitude of from about two to about six volts.

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97. An apparatus for stimulating a vagus nerve of a patient, comprising:

a first electrode positioned within the trachea of said patient;

a second electrode positioned on the neck of said patient; and

means operatively associated with said first and second electrodes for actuating at least one of said electrodes to create an electrical field effective to stimulate said vagus nerve.

98. The apparatus of Claim 97 wherein said second electrode is disposed on the neck of said patient approximately one centimeter from said first electrode in said trachea of said patient.

99. The apparatus of Claim 97, wherein said means for actuating at least one of said electrodes to create an electrical field comprises a means for actuating both of said first and second electrodes to create an electrical field.

100. The apparatus of Claim 97, wherein said means for actuating at least one of said electrodes to create an electrical field comprises a means for actuating one or both of said electrodes in one of a unipolar or a bipolar mode.

101. The apparatus of Claim 97, wherein said means for actuating at least one of said electrodes to create an electrical field is operative to actuate said at least one of said electrodes to stimulate said vagus nerve for a period of between about five and about ninety seconds.

102. The apparatus of Claim 101, wherein said actuating means is operative to actuate said at least one of said electrodes to stimulate said vagus nerve for a period of between about five and about fifteen seconds.

103. The apparatus of Claim 97, wherein said means for actuating at least one of said electrodes to create an electrical field comprises a means for transmitting an impulse to said at least one of said electrodes at a frequency of between about one Hertz and about five hundred Hertz.

104. The apparatus of Claim 103, wherein said means for transmitting an impulse to said at least one of said electrodes at a frequency of between about one Hertz and about five hundred Hertz comprises a means for transmitting an impulse to said at least one of said electrodes at a frequency of between about twenty Hertz and about eighty Hertz.

105. The apparatus of Claim 104, wherein said means for transmitting an impulse to said at least one of said electrodes at a frequency of between about twenty Hertz and about eighty Hertz comprises a means for transmitting an impulse to said at least one of said electrodes at a frequency of about forty Hertz.

106. The apparatus of Claim 97, wherein said means for actuating said electrode to create an electrical field comprises a means for transmitting electrical impulses having a duration of 0.4 msec for actuating said electrode.

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107. The apparatus of Claim 97, wherein said means for actuating said electrode to create an electrical field comprises a means for transmitting to said electrode an electrical impulse having an amplitude of from about one to about forty volts.

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108. The apparatus of Claim 107, wherein said means for transmitting to said electrode an electrical impulse having an amplitude of from about one to about forty volts comprises a means for transmitting to said electrode an electrical impulse having an amplitude of from about two to about six volts.

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109. An apparatus for stimulating a vagus nerve of a patient, comprising:

a first electrode positioned within a jugular vein of said patient;

5 a second electrode positioned on the neck of said patient;
and

means operatively associated with said first and second electrodes for actuating at least one of said electrodes to create an electrical field effective to stimulate said
10 vagus nerve.

110. The apparatus of Claim 109 wherein said second electrode is disposed on the neck of said patient approximately one centimeter from said first electrode in said jugular vein of
15 said patient .

111. The apparatus of Claim 109, wherein said means for actuating at least one of said electrodes to create an electrical field comprises a means for actuating both of said first and
20 second electrodes to create an electrical field.

112. The apparatus of Claim 109, wherein said means for actuating at least one of said electrodes to create an electrical field comprises a means for actuating one or both of said
25 electrodes in one of a unipolar or a bipolar mode.

113. The apparatus of Claim 109, wherein said means for actuating at least one of said electrodes to create an electrical field is operative to actuate said at least one of said electrodes to stimulate said vagus nerve for a period of between about five and about ninety seconds.

114. The apparatus of Claim 113, wherein said actuating means is operative to actuate said at least one of said electrodes to stimulate said vagus nerve for a period of between about five and about fifteen seconds.

115. The apparatus of Claim 109, wherein said means for actuating at least one of said electrodes to create an electrical field comprises a means for transmitting an impulse to said at least one of said electrodes at a frequency of between about one Hertz and about five hundred Hertz.

116. The apparatus of Claim 115, wherein said means for transmitting an impulse to said at least one of said electrodes at a frequency of between about one Hertz and about five hundred Hertz comprises a means for transmitting an impulse to said at least one of said electrodes at a frequency of between about twenty Hertz and about eighty Hertz.

117. The apparatus of Claim 116, wherein said means for transmitting an impulse to said at least one of said electrodes at a frequency of between about twenty Hertz and about eighty Hertz comprises a means for transmitting an impulse to said at least one of said electrodes at a frequency of about forty Hertz.

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118. The apparatus of Claim 109, wherein said means for actuating said electrode to create an electrical field comprises a means for transmitting electrical impulses having a duration of 0.4 msec for actuating said electrode.

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119. The apparatus of Claim 109, wherein said means for actuating said electrode to create an electrical field comprises a means for transmitting to said electrode an electrical impulse having an amplitude of from about one to about forty volts.

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120. The apparatus of Claim 119, wherein said means for transmitting to said electrode an electrical impulse having an amplitude of from about one to about forty volts comprises a means for transmitting to said electrode an electrical impulse having an amplitude of from about two to about six volts.

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